

### Remarks

The application originally contained Claims 1-18. Claims 1-3 were allowed. Claims 4-18 stand rejected for various reasons. Claims 4, 8-10 and 13-18 were deemed allowable if rewritten.

Claims 1-3, 8, 14, 16 and 18 remain as originally submitted. In response to the rejections, the applicant has amended Claims 4, 5, 10, 13, 15 and 17, and canceled Claims 6, 7, 9, 11 and 12. Thus, Claims 1-5, 8, 10, and 13-18 remain in the case

### The Drawing

In order to overcome the Examiner's objection thereto, the drawing has been changed to remove the label "Fig. 1." The specification has been accordingly amended to delete references to "Fig. 1." A replacement sheet including the amended drawing is attached as an appendix following page 12 of this paper.

### Allowance of Claims 1-3

The applicant gratefully acknowledges the allowance of Claims 1-3. They remain as originally submitted.

### Prior Art Rejections of Claims 5-7, 11 and 12

Claim 5 was rejected under 35 U.S.C. §102(b) as being anticipated by Eusebio Garate et al., "Novel cathode for field-emission applications," *Review of Scientific Instruments*, Vol. 66, No. 3, pp. 2528-2532, American Institute of Physics, New York, New York, USA (March 1995), hereinafter called "*Garate*." Claim 6 was rejected under 35 U.S.C. §103(a) as being obvious in view of *Garate*. Claim 6 has been canceled, and Claim 5 has been amended to include the Claim 6 limitation of "coating only tips of a carbon velvet material with the cesiated salt solution."

As admitted by the Examiner on page 5, at line 3, of the first Office Action, *Garate* "does not teach coating only the tips of carbon fiber shafts." Rather, *Garate*

teaches only "applying a saturated solution of Csl to the material using a fine brush."

Page 2529, lines 31-32

The burden is on the Commissioner of Patents and Trademarks, acting through examining officials, to establish that an applicant is not entitled to a patent. The obligation of the examiner to go forward and produce reasoning and evidence in support of obviousness is clearly defined at M.P.E.P. §2142:

The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.

A general definition of *prima facie* unpatentability is provided at 37 C.F.R. §1.56(b)(2)(ii):

A *prima facie* case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability. (emphasis added)

It follows that in the absence of such a *prima facie* showing of obviousness by the examiner (assuming there are no objections or other grounds for rejection), an applicant is entitled to grant of a patent. *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443 (Fed. Cir. 1992).

M.P.E.P. §2143 defines the three basic requirements necessary to establish a *prima facie* case of obviousness:

1. some suggestion or motivation, either in the reference or in the knowledge generally available to one of ordinary skill in the art, to modify the reference;
2. a reasonable expectation of success; and
3. the prior art reference must teach or suggest all the claim limitations.

*Garate* teaches only the use of a brush to apply a solution of Csl to the carbon fibers shown in Fig. 2. The Examiner has not pointed to any motivation, incentive or

suggestion of desirability to apply the solution only to the fiber tips. Contrary to the allusion made by the Examiner, application to the outer surface of the carbon fibers does not teach or suggest the claimed limitation of applying the solution only to the tips of a carbon velvet material. Although a prior art device "may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so." *In re Mills*, 916 F.2d 680, 682, 16 USPQ2d 1430, 1432 (Fed. Cir. 1990).

In view of the foregoing, the applicant respectfully asserts that the obviousness rejection of Claim 6, (which now applies to Claim 5 as amended to include the rejected limitation of Claim 6) is ill-advised and should be withdrawn because the Examiner has failed to carry his burden of providing compelling evidence of a teaching, suggestion or motivation to modify the reference to produce the claimed invention.

Claims 7, 11 and 12 were also rejected under 35 U.S.C. §103(a) as being obvious in view of *Garate*. In response, these claims have been canceled.

#### Rejection of Claims for Containing New Matter

The present application is a divisional of parent application 09/681,703. Claims 4 and 7-18 were rejected under 35 U.S.C. §112, first paragraph, for containing new matter, *i.e.*, as not having a basis in the specification because they do not have a basis in the parent application. In response, Claim 9 has been canceled.

Regarding Claim 4, the Office Action noted that this claim cited a specific film thickness and that the carbon velvet material has a plurality of shafts, and that these features were not described in the specification of the parent application. In response, Claim 4 has been amended to delete the foregoing limitations.

Claim 6 was not included in the new matter rejection stated in paragraph 3 of the Office Action. However, this claim was included on page 3, third paragraph, of the Office Action listing the claims rejected for citing a coating step coating only the tips of the carbon velvet. The applicant will therefore address the issue of whether such a limitation, now included in Claim 5 by amendment, comprises new matter.

Paragraph 14 of the parent specification describes placing the cathode "so that the carbon tips of the carbon velvet material extend into the molten bath [of cesiated salt] . . . with cesiated salt crystallizing at the cathode tips" after cooling. This plainly describes coating the tips and forming cesiated salt crystals at the tips, *i.e.*, where the material has been coated with the molten salt. As the claim limitation recites the parent specification's positive description of where the carbon velvet material is coated with molten salt, the applicant submits that the claim needs no further support, *i.e.*, it is unnecessary for the specification to describe the portions of the material where salt does not crystallize because no coating is applied. In view of the foregoing, the applicant respectfully asserts that the limitation of coating only the tips of the carbon velvet material is not new matter, and that the Claim 5 is patentable in its present, amended form.

Claim 8 recites "depositing a vaporized cesiated salt solution onto fibers of a carbon velvet material." The rejection contends that the parent specification "does not teach that a solution of the salt is applied by vapor deposition techniques." The applicant respectfully disagrees, and calls the Examiner's attention to paragraph 14 of the parent specification, wherein it is disclosed that "[c]esiated salt can also be deposited by chemical vapor deposition." The well-known process of chemical vapor deposition describes deposition of a vaporized solution comprised of cesiated salts mixed with a chemical or chemicals. The limitation of Claim 8 is clearly supported by the foregoing description. In view of thereof, the applicant requests that the rejection of Claim 8 be withdrawn.

As Claim 9 has been canceled, Claim 10 (originally depending from Claim 9) has been amended to change its dependency from Claim 9 to Claim 8. Claim 10 recites that "cesiated salt crystals are formed only on the tips" of the fibers of a carbon velvet material. The rejection asserts that coating only the tips of the carbon velvet is not described in the parent specification. Again, the applicant must take issue with the basis of the rejection.

More particularly, paragraph 14 of the parent specification describes placing the

cathode "so that the carbon tips of the carbon velvet material extend into the molten bath [of cesiated salt] . . . with cesiated salt crystallizing at the cathode tips" after cooling. This clearly describes coating the tips and forming cesiated salt crystals at the tips, and provides adequate support for the cited limitation. The applicant respectfully contends that it would be unnecessary, superfluous and impractical for the specification to further describe the portions of the carbon velvet material where salt does not crystallize because those portions are not immersed in the molten salt bath, in order to support the cited limitation. Therefore, the applicant respectfully submits that the limitation of forming cesiated salt crystals only on the tips is not new matter and requests withdrawal of the rejection of Claim 10.

Claim 13 was rejected for citing that the molten cesiated salt solution is cooled while the fibers are immersed, because this feature is not described in the parent specification. In response, Claim 13 has been amended to delete the foregoing limitation.

Claims 14, 16 and 18 recite that "only the tips" of the fibers of the carbon velvet material are dipped in the molten cesiated salt solution. The claims were rejected for citing that "only the tips" of the carbon velvet material are coated, and that is feature is not described in the parent specification. The applicant respectfully traverses these rejections.

As previously noted in conjunction with the discussions of Claims 5 and 10, paragraph 14 of the parent specification describes placing the cathode "so that the carbon tips of the carbon velvet material extend into the molten bath [of cesiated salt] . . . with cesiated salt crystallizing at the cathode tips" after cooling. It is clear from the foregoing that the tips are dipped into the molten bath, and that the cesiated salt forms to the extent that the material is dipped into the molten bath; that is, cesiated salt crystallizes at the tips because that is as far as the material is dipped into the bath. The applicant thus contends that the aforementioned limitation that "only the tips" are dipped is not new matter. Therefore, the applicant respectfully requests withdrawal of the rejections of Claims 14, 16 and 18, respectively.

Claim 15 was rejected for reciting that the fibers are cooled after being removed from the solution, because this feature is not described in the parent specification. In response, Claim 15 has been amended to delete the foregoing limitation.

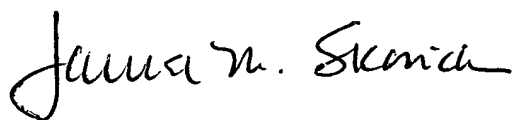
Claim 17 was rejected for reciting a specific film thickness that was not described in the parent specification. In response, Claim 17 has been amended to delete the foregoing limitation.

### Conclusion

Given the foregoing amendments and canceled claims, and in view of the foregoing remarks, the applicant submits that the specification, drawing and claims have been placed in allowable form. Accordingly, the applicant earnestly solicits the favorable consideration of his application, and respectfully requests that it be passed to issuance in its present condition.

Should the Examiner discern any remaining impediment to the prompt allowance of the aforementioned claims that might be resolved or overcome with the aid of a telephone conference, he is cordially invited to call the undersigned at the telephone number set out below.

Respectfully submitted,



James M. Skorich  
Attorney for the Applicant  
Registration No. 27,594

Air Force Research Laboratory  
Telephone No.: (505) 846-1542  
Fax No.: (505) 846-0279

Attachment: Replacement Drawing Sheet

September 2, 2004

Amendments to the Drawing:

The attached drawing sheet includes a change to the figure: the label "Fig. 1" has been removed. This sheet, which includes the only figure in the application, replaces the original sheet including the figure.